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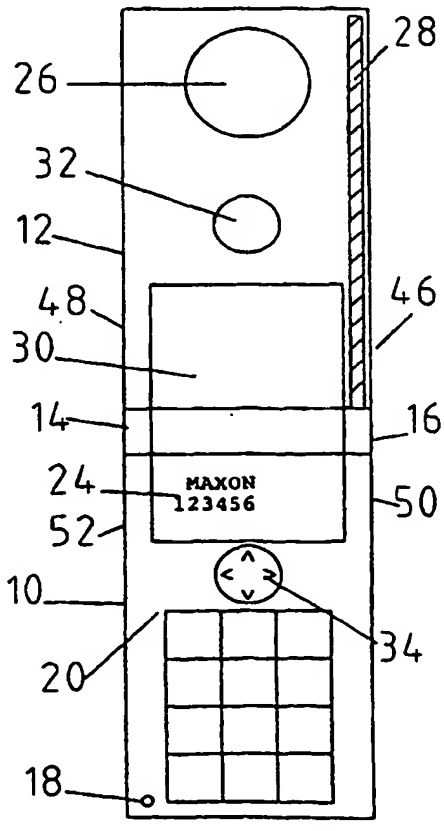
(54) Title: CELLULAR HANDHELD TELECOMMUNICATIONS DEVICE

(57) Abstract

A cellular handheld telecommunications device which is contained in a first and s second part of a housing, with the second part of the housing being connected to the first part of the housing by a hinge means such that the first and second parts of the housing can be folded together or unfolded, where the first part of the housing contains a microphone to receive voice energy, a transceiver to transmit/receive voice and/or data signals to/from a cellular base station, a keypad to enter control commands to control the operation of the device and/or to enter alphanumerical data to determine a party to be called and/or to generate a message to be sent to a party to be called, an alphanumerical display to display alphanumerical data related to a control command entered via said keypad or to a message to be sent or received, a battery to provide electrical power to the components of said device, and where the second part of the housing contains a speaker to emit received voice signals, and an rf antenna to transceive rf energy, and the second part of the housing is shaped and dimensioned such that when the first and second parts of the housing are folded together, the alphanumerical display in the first part of the housing is at least partly visible.



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Cellular handheld telecommunications device

Description

The present invention is related to a cellular handheld telecommunications device, and more specifically to the type of cellular handheld telecommunications device where the device is contained in a first and a second part of a housing with the second part of the housing being connected to the first part of the housing by a hinge means such that the first and second parts of the housing can be folded together or unfolded.

Various models of such cellular handheld telecommunications devices are available in the prior art. In some embodiments (e.g. Motorola's MicroTAC series), one part of the housing contains all the essential components (transceiver, battery, keypad, display, microphone, speaker, battery, antenna etc.), while the second part of the housing only serves as a lid or cover of the keypad. In this embodiment, the second part of the housing is basically provided for cosmetic reasons and does not serve as a containment for components.

In other embodiments (e.g. Nokia's Communicator series) in their closed position, the two halves of the housing entirely conceal the keypad and the display. Moreover, the device is relatively bulky and its shape is not very ergonomic.

Yet another type of models (e.g. Motorola's STARTAC series) also has two halves that form the housing. However, in the closed position of the two halves, the display (and the keypad) is not visible. Moreover, the battery is integrated into the upper half of the housing which - in the opened use

position - is held against the ear of the user. Thus, this device is relatively unbalanced due to a high centre of gravity. Moreover, in this device, the (extractable) antenna is provided in the lower (other) half of the housing, also resulting in cumbersome handling.

In view of the drawbacks of the known devices, the problem underlying the present invention is to provide a cellular handheld telecommunications device which is more user friendly and more ergonomic than the prior art devices.

To solve this problem, a cellular handheld telecommunications device having a first and a second part of a housing is provided, wherein the second part of the housing is connected to the first part of the housing by a hinge means such that the first and second parts of the housing can be folded together or unfolded, the first part of the housing contains a microphone to receive voice energy, a transceiver to transmit/receive voice and/or data signals to/from a cellular base station, a keypad to enter control commands to control the operation of the device and/or to enter alphanumerical data to determine a party to be called and/or to generate a message to be sent to a party to be called, an alphanumerical display to display alphanumerical data related to a control command entered via said keypad or to a message to be sent or received, a battery to provide electrial power to the components of said device, and the second part of the housing contains a speaker to emit received voice signals, and an rf antenna to transceive rf energy, and the second part of the housing is dimensioned such that when the first and second parts of the housing are folded together, the alphanumerical display in the first part of the housing is at least partly visible.

This unique concept provides a number of advantages over the prior art. First of all, when the two parts of the housing are in their unfolded (use) position, the microphone and the

speaker are in their optimum distance. Moreover, the user can select the angle between the two halves so that the user's individual desires for the distance between the microphone and the speaker can be adjusted.

Secondly, even in the closed (standby) position of the device, the display is (at least) partly visible, so that incoming messages or the like are readily visible.

Furthermore, since the battery is provided in the same part of the housing as the transceiver, there is no requirement for a flexible (rotatable) power line connecting the two parts of the housing.

Also, the weight distribution between the two halves of the device is more convenient for the user since in use, the "heavier" half (containing the battery, the keypad, the display and the microphone) lies in the palm of the user's hand.

With the antenna being provided in the upper ("lighter") half of the device, the rf energy transmission and reception is improved over a design, where the antenna is virtually surrounded by the user' hand and head.

All these advantages result directly from the unique concept according to the invention described above.

In a preferred embodiment of the present invention, the second part of the housing is dimensioned such that when the first and second parts of the housing are folded together, the keypad is at least partly accessible. This feature allows for an easy access to the functionality of the device. While in prior art devices having two halves, the user must open the device in order to operate the keypad, the invention allows to operate the keypad (enter messages, edit the telephone directory in the device, select menu items provided

in the device etc.) without having to open it. Hence, the device can be put on a table in its closed (less prominent) position while still allowing to access (at least a part of) its features.

In a presently preferred embodiment of the invention, a special key (e.g. a cross switch) is the only key accessible in the closed position of the device. Nevertheless, the software in the device controlling the menu and its functions is so designed that the user has all options available by selectively operating this special key.

In another embodiment, the keypad is (at least partly) designed as a part of a touch screen. Hence, relevant functions of the device are accessible while the device is in its closed (Standby) mode of operation.

In another embodiment of the present invention, the second part of the housing contains an rf shielding to protect a user's head against rf radiation when the device is held at user's head with the first and second parts of the housing unfolded. While this feature is relatively difficult to achieve in a device where the antenna is in the part of the housing containing all relevant parts of the telephone, the device according to the invention allows for this option very easily.

Alternatively, a conventional rod type antenna could be provided the first part of the housing and rf shielding in the second part of the housing provides some protection against radiation into the user's head.

While prior art designs require relatively complicated connections (Motorola StarTac: flexible power line, Nokia Communicator: flexible multiwire) to connect the components in the two halves of the housing, in one embodiment, the present invention teaches that the hinge means connecting the

first and second parts of the housing is formed by two joints, and that the joints are provided at two opposite walls of the first and second parts of the housing, respectively.

More specifically, one of said joints comprises a rotatable rf connection to connect said rf antenna and said transceiver, and another of said joints comprises a rotatable electrical connection to connect said speaker and said transceiver. The rotatable rf connection can be formed by a coaxial male/female rf coupling. The connection for the speaker can be formed in a similar manner.

Other features, characteristics, advantages and modifications of the present invention are explained in detail in the following description of an embodiment of the invention with reference to the enclosed drawings.

Fig. 1 is a schematic top view of the cellular handheld telecommunications device according to the present invention in its opened state.

Fig. 2 is a schematic side view of the cellular handheld telecommunications device of Fig. 1.

Fig. 3 is a schematic top view of the cellular handheld telecommunications device of Fig. 1 in its closed state.

Fig. 4 is a schematic side view of the cellular handheld telecommunications device of Fig. 3.

The drawings show a cellular handheld telecommunications device which is mounted in a a first part (10) and a second part (12) of a housing. The second part (12) of the housing is connected to the first part (10) of the housing by a hinge (14, 16). Thus, the first and second parts (10, 12) of the housing can be folded together (as shown in Fig. 3 and 4) or

unfolded (as shown in Fig. 1 and 3). The first and second parts (10, 12) of the housing have a generally rectangular shape and the hinge 14, 16 connects the first and second parts (10, 12) of the housing at a short edge of the two halves (10, 12), respectively. In other embodiments of the device according to the invention, the shapes of the first and second parts (10, 12), respectively are more rounded or oval.

The first part (10) of the housing contains a microphone (18) to receive voice energy from a user, a transceiver (not shown in the Figs.) to transmit/receive voice and/or data signals to/from a cellular base station, a keypad (20) to enter control commands to control the operation of the device and/or to enter alphanumerical data to determine a party to be called and/or to generate a message to be sent to a party to be called, and an alphanumerical display (24) to display alphanumerical data related to a control command entered via said keypad or to a message to be sent or received. Moreover, a battery (22) is removably attached to the first part (10) of the device to provide electrial power to the components of the device.

The second part (12) of the housing contains a speaker (26) to emit voice signals received by the transceiver, and an rf antenna (28) to transceive rf energy.

The second part (12) of the housing is provided with a cutout (30) having essentially the size and the shape of the display (24). Thus, when the first and second parts (10, 12) of the housing are folded together (Fig. 3), the alphanumerical display (24) is visible through the cutout (30).

Moreover, the second part (12) of the housing is dimensioned and shaped such that when the first and second parts (10, 12) of the housing are folded together, a cross-switch (34) of the keypad (20) is accessible. This is achieved by an opening

(32) in the second part (12) of the housing allowing the cross-switch (34) of the keypad (20) to project through through the second part (12) of the housing.

Furthermore, the second part (12) of the housing contains an rf shielding (40) provided adjacent to the wall (42) of the second part (12) of the housing which in use is oriented towards the user's head. Thus, the user's head is at least partially protected against rf radiation when the device is held at user's head with the first and second parts (10, 12) of the housing unfolded.

The hinge (14, 16) which connects the first and second parts (10, 12) of the housing is formed by two joints which are provided at two opposite walls (46, 48; 50, 52) of the second part and of the first part of the housing, respectively.

One of said joints (16) (the right joint in Fig. 1) comprises a rotatable rf connection to connect the rf antenna 28 and the transceiver. The other of the joints (14) the left joint in Fig. 1) comprises a rotatable electrical connection to connect the speaker 26 and said transceiver.

Claims

1. A cellular handheld telecommunications device which is contained in
- a first and a second part of a housing,
- with the second part of the housing being connected to the first part of the housing by a hinge means such that the first and second parts of the housing can be folded together or unfolded,
- the first part of the housing contains
- a microphone to receive voice energy,
- a transceiver to transmit/receive voice and/or data signals to/from a cellular base station,
- a keypad to enter control commands to control the operation of the device and/or to enter alphanumerical data to determine a party to be called and/or to generate a message to be sent to a party to be called,
- an alphanumerical display to display alphanumerical data related to a control command entered via said keypad or to a message to be sent or received,
- a battery to provide electrial power to the components of said device, and
- the second part of the housing contains
- a speaker to emit received voice signals, and
- an rf antenna to transceive rf energy, and
- the second part of the housing is shaped and dimensioned such that when the first and second parts of the housing are folded together, the alphanumerical display in the first part of the housing is at least partly visible.

2. The cellular handheld telecommunications device according to claim 1, characterized in that
- the second part of the housing is dimensioned such that when the first and second parts of the housing are folded together, the keypad is at least partly accessible.

3. The cellular handheld telecommunications device according to claim 1 or 2, characterized in that,
- a special key of the keypad is the only key accessible in the closed position of the device.

4. The cellular handheld telecommunications device according to claim 1, 2 or 3, characterized in that
- the keypad is designed as a part of a touch screen.

5. The cellular handheld telecommunications device according to claim 1, 2, 3, or 4, characterized in that
- the second part of the housing contains an rf shielding to protect a user's head against rf radiation when the device is held at user's head with the first and second parts of the housing unfolded.

6. The cellular handheld telecommunications device according to claim 1, 2, 3, 4, 5, or 6, characterized in that
- the hinge means connecting the first and second parts of the housing is formed by two joints, and that
- the joints are provided at two opposite walls of the first and second parts of the housing, respectively.

7. The cellular handheld telecommunications device according to claim 6, characterized in that
- one of said joints comprises a rotatable rf connection to connect said rf antenna and said transceiver, and
- another of said joints comprises a rotatable electrical connection to connect said speaker and said transceiver.

Fig.1

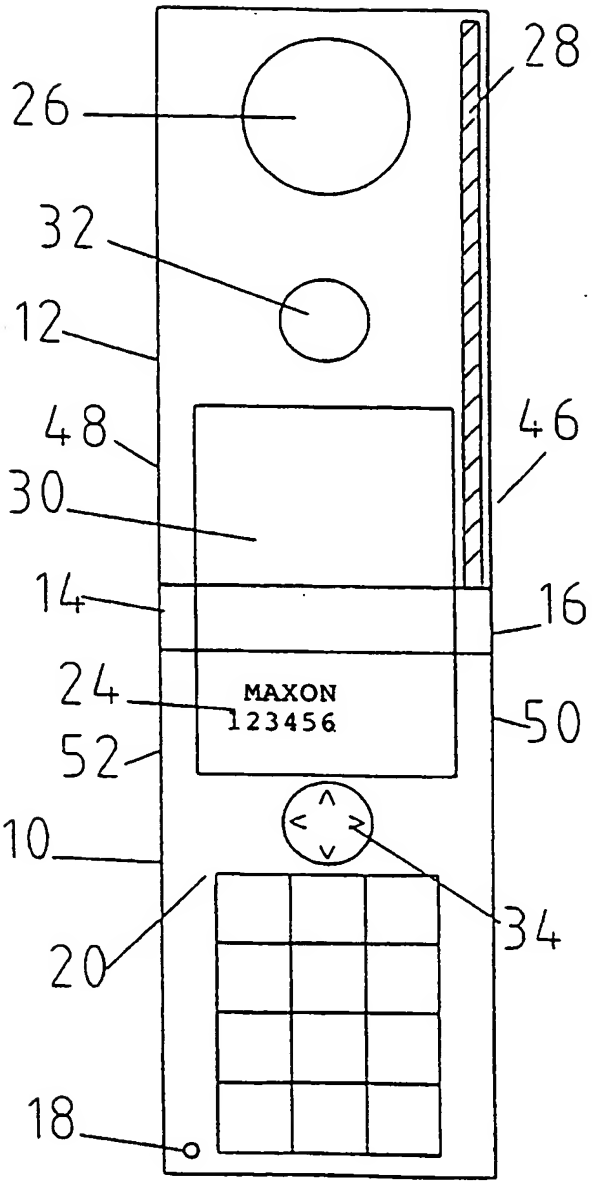

26
28
32
12
48
46
30
14
16
24
MAXON
123456
50
52
10
34
20
18

Fig.2

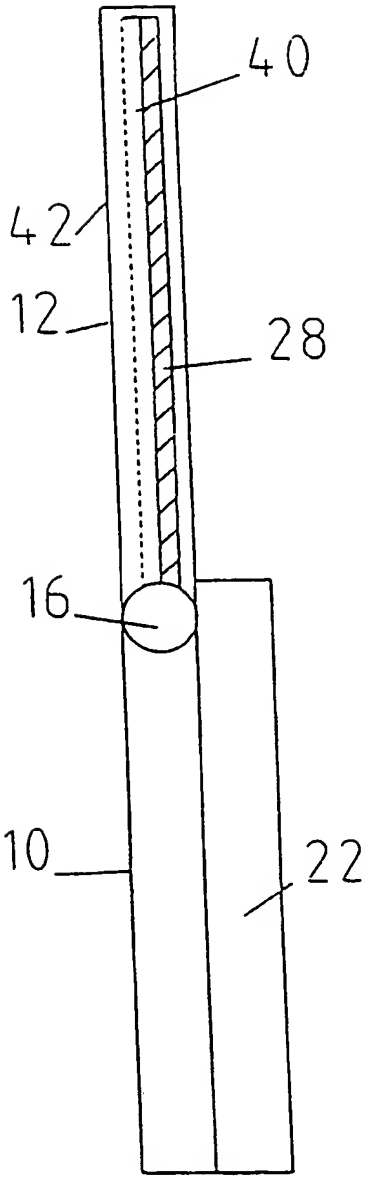
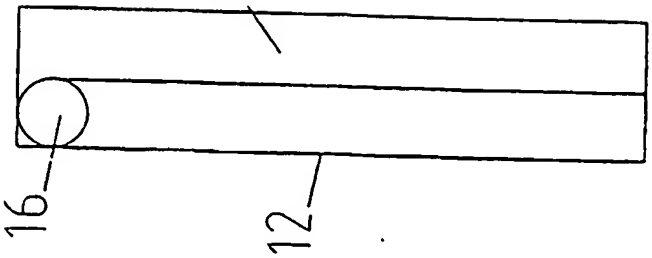

40
42
12
28
16
10
22

Fig.4



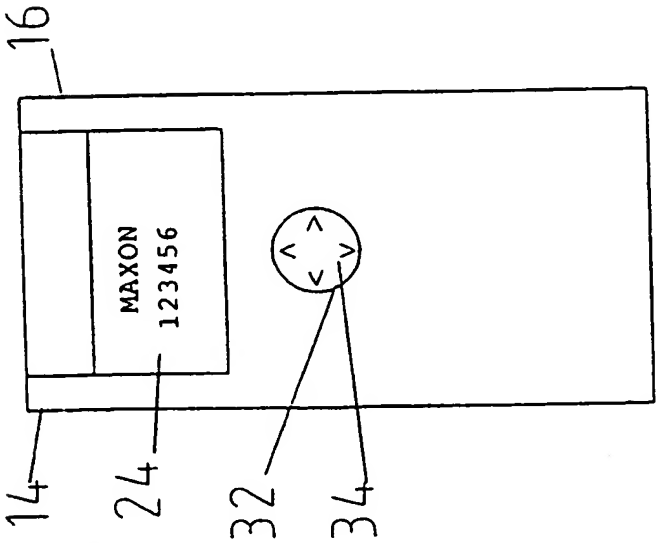


Fig.3